

## CLAIMS

What is claimed is:

- 1           1.     A diving-tank-pocket buoyancy compensator comprising:  
2                     a diving-tank pocket that is articulated for containing at least a diving  
3 tank and an inflatable buoyancy air cell;  
4                     the buoyancy air cell being in fluid communication with a cell end of  
5 a buoyancy compensator (BC) tube which has a tank end in fluid communication  
6 with an inside periphery of the diving tank through a regulator valve on the diving  
7 tank and through a regulator tube in fluid communication intermediate the regulator  
8 valve on the diving tank and the cell end on the BC tube;  
9                     a pressure valve intermediate the tank end and the cell end of the BC  
10 tube for maintaining a constant pressure and resulting constant volume of air in the  
11 buoyancy air cell without overfill of the buoyancy air cell and thereby for providing  
12 a desired constant buoyancy with volume of air in the buoyancy air cell by adjusting  
13 for any change in volume and pressure in the buoyancy air cell resulting from  
14 intentional inlet of air through an inflation valve in the BC tube and outlet of air  
15 through a cell-outlet valve in the BC tube and outlet of air through a cell-relief valve  
16 in the buoyancy air cell selectively and resulting also from possible minor valve and  
17 air-cell leakage; and  
18                     the diving tank being attachable to a predetermined diving-chute harness  
19 with at least one tank strap .

1           **2.**     The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                     the diving-tank pocket includes a pocket-attachment portion that is  
3 positioned intermediate a chute-attachment portion of the diving-chute harness and  
4 a tank-attachment portion of the tank strap for avoiding contact of the tank strap  
5 with users.

1           **3.**     The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                     the diving-tank pocket is closable with a pocket closer intermediate a  
3 tank-top end and tank-bottom end.

1           **4.**     The diving-tank-pocket buoyancy compensator of claim 3 wherein:  
2                     the pocket closer includes a diving-adapted zipper.

1           **5.**     The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                     the diving-tank pocket includes a predeterminedly streamlined contour  
3 with the tank-top end being predeterminedly arcuate.

1           **6.**     The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                     the diving-tank pocket includes volumetric capacity for containing the  
3 buoyancy air cell in an inflated mode in addition to containing the diving tank.

1           **7.**     The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                     the diving-tank pocket includes volumetric capacity for containing the  
3 buoyancy air cell in an inflated mode and the diving tank in addition to having  
4 additional storage space.

1           **8.**     The diving-tank-pocket buoyancy compensator of claim **1** wherein:  
2                     the tank strap includes a metallic strap and has a predeterminedly quick-  
3 release buckle.

1           **9.**     The diving-tank-pocket buoyancy compensator of claim **8** wherein:  
2                     the tank strap includes a tightness adjuster.

1           **10.**    The diving-tank-pocket buoyancy compensator of claim **1** wherein:  
2                     the pressure valve includes a control conveyance in fluid  
3 communication from the BC tube to a check valve that is adjustably spring-loaded  
4 with an adjustment spring having tension adjustment with a screw-threaded  
5 adjustment knob for allowing bypass of air selectively to an overflow outlet for  
6 allowing excess air pressure to escape from the buoyancy air cell controllably.

1           **11.**    The diving-tank-pocket buoyancy compensator of claim **10** and further  
2 comprising:  
3                     a water seal for restricting entry of water into the control conveyance.

1           **12.**    The diving-tank-pocket buoyancy compensator of claim **11** wherein:  
2                     the water seal includes a resilient sleeve that is articulated and  
3 positioned on the overflow outlet for being pressured in closing contact with the  
4 overflow outlet from water pressure when overflow air is not escaping through the  
5 overflow outlet.

1           **13.**   The diving-tank-pocket buoyancy compensator of claim **10** and further  
2 comprising:

3                   an on-off switch positioned in flow-control communication intermediate  
4 the control conveyance and the overflow outlet.

1           **14.**   The diving-tank-pocket buoyancy compensator of claim **9** wherein:  
2                   the check valve of the pressure valve is adjustable for preventing  
3 overfill of the buoyancy air cell by adjusting spring pressure of the adjustment  
4 spring for allowing escape of air through the overflow outlet from pressure in excess  
5 of a maximum selected with the adjustment knob.

1           **15.**   The diving-tank-pocket buoyancy compensator of claim **1** wherein:  
2                   the pressure valve includes a side-mount valve;  
3                   the side-mount valve includes the control conveyance in fluid  
4 communication from the BC tube;  
5                   the check valve for the side-mount valve includes a conical valve  
6 having a point portion of the conical valve positioned cyclically in contact with a  
7 valve seat for valved air flow to the overflow outlet as regulated with pressure of the  
8 adjustment spring for allowing opening of the conical valve.

1           **16.**   The diving-tank-pocket buoyancy compensator of claim **15** and further  
2 comprising:

3                   a water seal for restricting entry of water into the control conveyance.

1           **17.**   The diving-tank-pocket buoyancy compensator of claim **16** wherein:  
2                   the water seal includes a resilient sleeve that is articulated and  
3 positioned on the overflow outlet for being pressured in closing contact with the  
4 overflow outlet from water pressure when overflow air is not escaping through the  
5 overflow outlet.

1           **18.**   The diving-tank-pocket buoyancy compensator of claim **10** wherein:  
2                   connection means and tensile strength of the of the pressure valve  
3 intermediate the cell end and the tank end of the BC tube are articulated with  
4 strength sufficient to allow jerking of any portion of the BC tube for jerk-operation  
5 of an emergency-release valve proximate a BC-tube air entry into the buoyancy air  
6 cell for quick emergency dives to escape boat propellers and other emergencies.

1           **19.**   The diving-tank-pocket buoyancy compensator of claim **15** wherein:  
2                   connection means and tensile strength of the of the side-mount valve  
3 intermediate the cell end and the tank end of the buoyancy compensator (BC) tube  
4 are articulated with strength sufficient to allow jerking of any portion of the BC tube  
5 for jerk-operation of an emergency-release valve proximate a BC-tube air entry into  
6 the buoyancy air cell for quick emergency dives to escape boat propellers and other  
7 emergencies.

1           **20.**   The diving-tank-pocket buoyancy compensator of claim **1** wherein:  
2                   the diving-tank pocket includes a generally cylindrical shape.

1           **21.**   The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                   the diving-tank pocket includes flexible structure with neoprene.

1           **22.**   The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                   the buoyancy air cell includes an envelope cell that is wrapped onto the  
3 diving tank.

1           **23.**   The diving-tank-pocket buoyancy compensator of claim 1 wherein:  
2                   the buoyancy air cell includes twin cells that are positioned on opposite  
3 sides of the diving tank and joined with an umbilical member; and  
4                   the umbilical member is positioned adjacent to a predetermined portion  
5 of the diving tank.

1           **24.**   The diving-tank-pocket buoyancy compensator of claim 23 wherein:  
2                   the umbilical member includes structure for air conveyance for balancing  
3 air pressure and volume in the twin cells when adding air to or releasing air from the  
4 twin cells.

1           **25.**   A diving-tank-pocket buoyancy compensator comprising:  
2                   a diving-tank pocket having an internal portion that is attachable to a  
3 diving tank which the diving-tank pocket is articulated for containing in addition to  
4 containing an inflatable buoyancy air cell in an inflated mode; and  
5                   the diving-tank pocket being attachable to a diving-chute harness.

1           **26.**   The diving-tank-pocket buoyancy compensator of claim **25** wherein:  
2                   the buoyancy air cell is in fluid communication with a cell end of a BC  
3 tube which has a tank end in fluid communication with an inside periphery of the  
4 diving tank through a regulator tube and a regulator valve on the diving tank.

1           **27.**   The diving-tank-pocket buoyancy compensator of claim **25** and further  
2 comprising:  
3                   a pressure valve intermediate the tank end and the cell end of the BC  
4 tube for maintaining a constant pressure and resulting constant volume of air in the  
5 buoyancy air cell to provide a desired constant buoyancy and overfill with volume  
6 of air in the buoyancy air cell.

1           **28.**   The diving-tank-pocket buoyancy compensator of claim **27** wherein:  
2                   the pressure valve includes a control conveyance in fluid communication  
3 from the BC tube to a check valve that is adjustably spring-loaded with an  
4 adjustment spring having tension adjustment with a screw-threaded adjustment knob  
5 for allowing bypass of air selectively to an overflow outlet;  
6                   the check valve of the pressure valve is adjustable for preventing  
7 overfill of the buoyancy air cell by adjusting spring pressure of the adjustment  
8 spring for allowing bypass of air with pressure in excess of a selected maximum with  
9 the adjustment knob.

1           **29.**   The diving-tank-pocket buoyancy compensator of claim **28** and further  
2 comprising:  
3                   a water seal for restricting entry of water into the control conveyance.

1           **30.**   The diving-tank-pocket buoyancy compensator of claim 29 wherein:  
2                   the water seal includes a resilient sleeve that is articulated and  
3 positioned on the overflow outlet for being pressured in closing contact with the  
4 overflow outlet from water pressure when overflow air is not escaping through the  
5 overflow outlet.

1           **31.**   The diving-tank-pocket buoyancy compensator of claim 30 and further  
2 comprising:  
3                   a bypass valve in the control conveyance for allowing flow of air  
4 through the BC tube without regulated escape through the pressure valve selectively.

1           **32.**   The diving-tank-pocket buoyancy compensator of claim 31 wherein:  
2                   the diving-tank pocket is closable with a pocket closer intermediate a  
3 tank-top end and tank-bottom end;  
4                   the pocket closer includes a diving-adapted zipper;  
5                   the diving-tank pocket includes a predeterminedly streamlined contour  
6 with the tank-top end being predeterminedly arcuate; and  
7                   the diving-tank pocket includes volumetric capacity for containing the  
8 buoyancy air cell in an inflated mode in addition to containing the diving tank.



1       **33.**   The diving-tank-pocket buoyancy compensator of claim **28** wherein:  
2               the pressure valve includes a side-mount valve;  
3               the side-mount valve includes the control conveyance in fluid  
4 communication from the BC tube to the check valve that is adjustably spring-loaded  
5 with the adjustment spring having tension adjustment with the screw-threaded  
6 adjustment knob for allowing bypass of air selectively to the overflow outlet;  
7               the check valve for the side-mount valve includes a conical valve  
8 having a point portion of the conical valve positioned cyclically in a valve seat to  
9 the overflow outlet with pressure of the adjustment spring for closing the check  
10 valve and having a conical shoulder portion of the conical valve exposed to air  
11 pressure from the control conveyance for forcing the conical valve against pressure  
12 of the adjustment spring for opening the check valve.

1       **34.**   The diving-tank-pocket buoyancy compensator of claim **33** and further  
2 comprising:  
3               a water seal for restricting entry of water into the control conveyance.

1       **35.**   The diving-tank-pocket buoyancy compensator of claim **34** wherein:  
2               the water seal includes a resilient sleeve that is articulated and  
3 positioned on the overflow outlet for being pressured in closing contact with the  
4 overflow outlet from water pressure when overflow air is not escaping through the  
5 overflow outlet.

1           **36.**   The diving-tank-pocket buoyancy compensator of claim **35** and further  
2 comprising:

3                   a bypass valve in the control conveyance for allowing flow of air  
4 through the BC tube without regulated escape through the pressure valve selectively.

1           **37.**   The diving-tank-pocket buoyancy compensator of claim **28** wherein:  
2                   the pressure valve is positioned and is oriented predeterminedly in  
3 relationship to the BC tube for being readily accessible for finger rotation of the  
4 adjustment knob.

1           **38.**   The diving-tank-pocket buoyancy compensator of claim **33** wherein:  
2                   the pressure valve is positioned and is oriented predeterminedly in  
3 relationship to the BC tube for being readily accessible for finger rotation of the  
4 adjustment knob.

1           **39.**   The diving-tank-pocket buoyancy compensator of claim **36** wherein:  
2                   the check valve for the pressure valve includes a conical valve having  
3 a point portion of the conical valve positioned cyclically in the valve seat to the  
4 overflow outlet with pressure of the adjustment spring for closing the check valve  
5 and having a conical shoulder portion of the conical valve exposed to air pressure  
6 from the control conveyance for forcing the conical valve against pressure of the  
7 adjustment spring for opening the check valve.

1           **40.**   The diving-tank-pocket buoyancy compensator of claim **39** wherein:  
2                   the pressure valve is positioned and is oriented predeterminedly in  
3 relationship to the BC tube for being readily accessible for finger rotation of the  
4 adjustment knob.

1           **41.**   The diving-tank-pocket buoyancy compensator of claim **25** wherein:  
2                   the diving-tank pocket includes flexible structure with neoprene.

1           **42.**   The diving-tank-pocket buoyancy compensator of claim **25** wherein:  
2                   the buoyancy air cell includes an envelope cell that is wrapped onto the  
3 diving tank.

1           **43.**   The diving-tank-pocket buoyancy compensator of claim **25** wherein:  
2                   the buoyancy air cell includes twin cells that are positioned on opposite  
3 sides of the diving tank and joined with an umbilical member; and  
4                   the umbilical member is positioned adjacent to a predetermined portion  
5 of the diving tank.

1           **44.**   The diving-tank-pocket buoyancy compensator of claim **43** wherein:  
2                   the umbilical member includes structure for air conveyance for balancing  
3 air pressure and volume in the twin cells when conveying air to and releasing air from  
4 the twin cells.

1           **45.**   The diving-tank-pocket buoyancy compensator of claim 25 wherein:  
2                   the diving-tank pocket is arcuate at the tank-top end and at the tank-  
3 bottom end with an end closure for use as a diving bag that is closable intermediate  
4 the tank-top end and at the tank-bottom end with the pocket closer; and  
5                   at least one handle is affixed to a top side for carrying the diving-tank  
6 pocket and other diving gear independently of whether the diving tank is attached  
7 internally to the diving-tank pocket.

1           **46.**   The diving-tank-pocket buoyancy compensator of claim 25 wherein:  
2                   the diving-tank pocket is orthogonal at the tank-top end and at the tank-  
3 bottom end with the end closer for use as a diving bag that is closable intermediate  
4 the tank-top end and at the tank-bottom end with the pocket closer; and  
5                   at least the one handle is affixed to the top side for carrying the diving-  
6 tank pocket and other diving gear independently of whether the diving tank is  
7 attached internally to the diving-tank pocket.